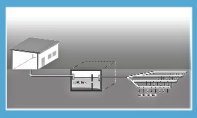
Leach Field

العربية (/ar/sanitation-systems/sanitation-technologies/leach-field)

Applicable to	Application level	Management level	Inputs	Outputs
System 6 (/humanitarian-crises/rural-settings/sanitation/sanitation-systems/system-6%3A-blackwater-treatment-system-with-infiltration)	City Household Neighborhood	Household Public Shared	Effluent	



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Adapted from

Compendium of Sanitation Systems and Technologies. 2nd Revised Edition (/node/5587)

Executive Summary

A leach field, or drainage field, is a network of perforated pipes that are laid in underground gravel-filled trenches to dissipate the effluent from a water-based collection and storage/treatment or (semi-)centralized treatment technology.

Advantages

- Can be used for the combined treatment of blackwater and greywater
- Has a long lifespan (depending on conditions)
- Low maintenance requirements if operating without mechanical equipment
- Relatively low capital costs, low operating costs

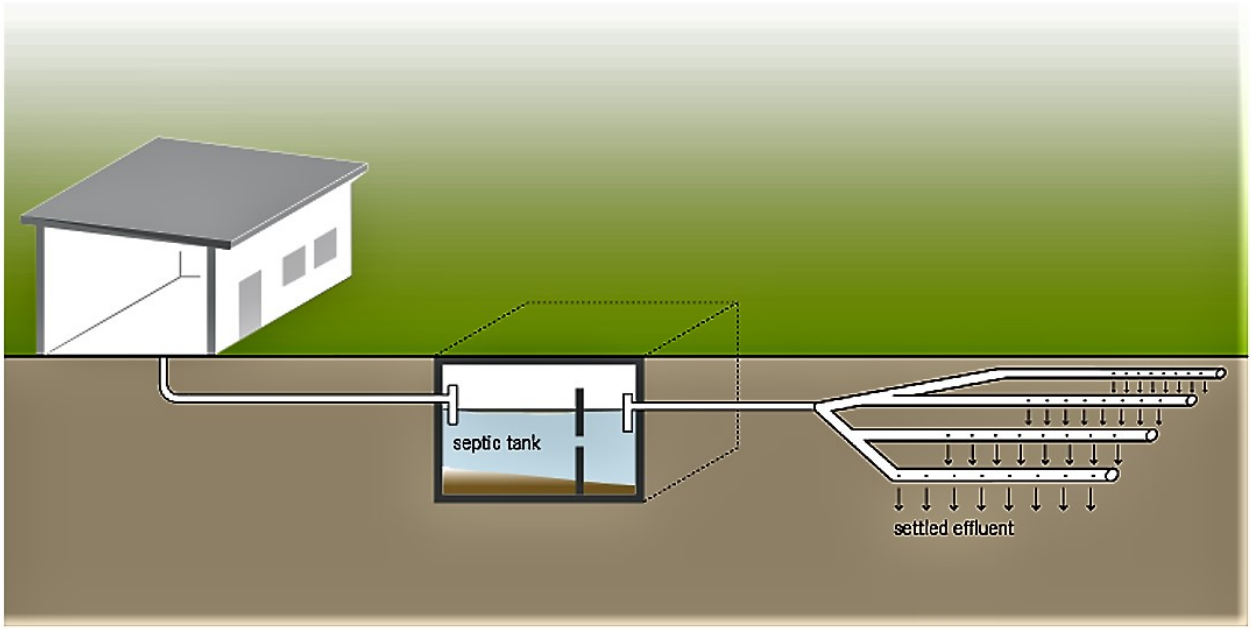
Disadvantages

- Requires expert design and construction
- Not all parts and materials may be locally available
- Requires a large area
- Primary treatment is required to prevent clogging
- May negatively affect soil and groundwater properties

In	Out
Greywater, Urine or Yellowwater, Fertigation Water, Treated Water (Effluents from On-site Pre-settling Units)	-

Introduction

Pre-settled effluent is fed into a piping system (distribution box and several parallel channels) that distributes the flow into the subsurface soil for absorption and subsequent treatment. A dosing or pressurized distribution system may be installed to ensure that the whole length of the leach field is utilized and that aerobic conditions are allowed to recover between dosings. Such a dosing system releases the pressurized effluent into the leach field with a timer (usually 3 to 4 times a day).



Schematic of a leach field. Source: TILLEY et al. (2014)

Design Considerations

Each trench is 0.3 to 1.5 m deep and 0.3 to 1 m wide. The bottom of each trench is filled with about 15 cm of clean rock and a perforated distribution pipe is laid on top. More rock is placed to cover the pipe. A layer of geotextile fabric is placed on the rock layer to prevent small particles from plugging the pipe. A final layer of sand and/or topsoil covers the fabric and fills the trench to the ground level. The pipe should be placed at least 15 cm beneath the surface to prevent effluent from surfacing. The trenches should be dug no longer than 20 m in length and at least 1 to 2 m apart. To prevent contamination, a leach field should be located at least 30 m away from any drinking water source. A leach field should be laid out such that it will not interfere with a future sewer connection. The collection technology which precedes the leach field (e.g., **septic tank (/factsheet/septic-tank)**) should be equipped with a sewer connection so that if, or when, the leach field needs to be replaced, the changeover can be done with minimal disruption.

Health Aspects/Acceptance

Since the technology is underground and requires little attention, users will rarely come in contact with the effluent and, therefore, it has no health risk. The leach field must be kept as far away as possible (at least 30 m) from any potential potable water source to avoid contamination.

Operation & Maintenance

A leach field will become clogged over time, although this may take 20 or more years, if a well-maintained and well-functioning primary treatment technology is in place. Effectively, a leach field should require minimal maintenance; however, if the system stops working efficiently, the pipes should be cleaned and/or removed and replaced. To maintain the leach field, there should be no plants or trees on it. There should also be no heavy traffic above it because this could crush the pipes or compact the soil.

Applicability

Leach fields require a large area and unsaturated soil with good absorptive capacity to effectively dissipate the effluent. Due to potential oversaturation of the soil, leach fields are not appropriate for dense urban areas. They can be used in almost every temperature, although there may be problems with pooling effluent in areas where the ground freezes.

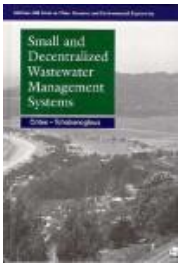
Homeowners who have a leach field must be aware of how it works and of their maintenance responsibilities. Trees and deep-rooted plants should be kept away from the leach field as they can crack and disturb the tile bed.

Media PPT

Leach Fields (PPT) (/media/24)

Library References

Small and Decentralized Wastewater Management Systems



Decentralised wastewater management presents a comprehensive approach to the design of both conventional and innovative systems for the treatment and disposal of wastewater or the reuse of treaded effluent. Smaller treatment plants, which are the concern of most new engineers, are the primary focus of this book.

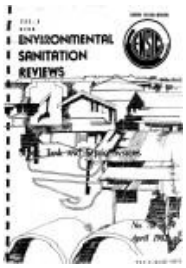
CRITES, R. TCHOBANOGLOUS, G. (1998): Small and Decentralized Wastewater Management Systems. New York: The McGraw-Hill Companies Inc

Greywater Management in Low and Middle-Income Countries, Review of Different Treatment Systems for Households or Neighbourhoods

This report compiles international experience in greywater management on household and neighbourhood level in low and middle-income countries. The documented systems, which vary significantly in terms of complexity, performance and costs, range from simple systems for single-house applications (e.g. local infiltration or garden irrigation) to rather complex treatment trains for neighbourhoods (e.g. series of vertical and horizontal-flow planted soil filters).

MOREL, A. DIENER, S. (2006): Greywater Management in Low and Middle-Income Countries, Review of Different Treatment Systems for Households or Neighbourhoods. (= SANDEC Report No. 14/06). Duebendorf: Swiss Federal Institute of Aquatic Science (EAWAG), Department of Water and Sanitation in Developing Countries (SANDEC) **URL (https://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/947)** [Accessed: 27.05.2019]

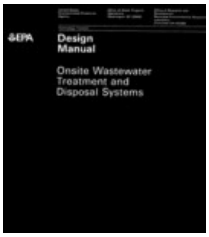
Septic Tank and Septic Systems



This paper presents a review on the septic tank and septic systems. Information on design and functional aspects, and environmental effects of septic tank systems are presented.

POLPRASERT, C. RAJPUT, V.S. (1982): Septic Tank and Septic Systems. (= Environmental Sanitation Reviews , 7). Bangkok: Environmental Sanitation Information Center **URL (http://www.irc.nl/docsearch/title/107733)** [Accessed: 08.04.2014]

Design Manual - Onsite Wastewater Treatment and Disposal Systems



Rather old design manual for onsite wastewater treatment options. However, valuable information on established systems such as septic tanks, sandfilters, aerobic treatment units (suspendend growth and fixed film), disinfection, nutrient removal as well as wastewater segregation and recycling are given. Additional information is given on disposal methods and appurtenances.

U.S. EPA (1980): Design Manual - Onsite Wastewater Treatment and Disposal Systems. (= EPA 625/1-80-0). United States Environmental Protection Agency and Office of Water Office of Research and Development **URL (https://www.epa.gov/sites/production/files/2015-06/documents/septic_1980_osdm_all.pdf)** [Accessed: 27.05.2019]